

**DOE MARSHALL ISLANDS
RADIOLOGICAL ENVIRONMENTAL
PROGRAM**

Provided By:

**Lawrence Livermore National Lab
Health & Ecological Assessment
Division**

Director:

William Robison, Ph.D.

ES&H Letter (4/1/91) (Continued)



U.S. Government Officials (AEC, ERDA, DOE) Involved in Marshall Islands Programs

Dr. Bill Burr (AEC, ERDA) 1973–1977
Dr. Charlie Edlington (OHER) 1975–1977
Dr. Helen McCammon (OHER) 1976–1978
Hal Hollister (ES&H) 1978–1983
Dr. Bruce Wachholz (ES&H) 1978–1983
Joe Deal (ES&H) 1978–
Tom McCraw (ES&H) 1978–1983
John Randolph (DP) 1983–1990
Roger Ray (NVOO: OHER, ES&H, DP)
1974–1985(Sept.)
Harry Brown (NVOO/DP) 1985–1990

ES&H Letter (4/1/91) (Continued)



Historical Sequence of Program Development

- 1. 1972-73 — Enewetak Radiological Survey – AEC directed**
 - a. President Johnson
 - b. Ambassador Hayden Williams
 - c. End result – dose assessment; data inadequate
- 2. 1974 — LLNL Enewetak Atoll Program – AEC directed; OHER**
 - a. Enjebi Island garden
 - b. Other islands
- 3. 1975 — Preliminary Bikini Survey – ERDA directed; OHER**
- 4. 1977 — LLNL Bikini Atoll Program – ERDA directed; DOS**
 - a. Eneu Island garden plus available coconut trees
 - b. Bikini Island coconut trees, papaya, later breadfruit and *Pandanus*

ES&H Letter (4/1/91) (Continued)

Historical Sequence of Program Development (Continued)

5. 1978 — Northern Marshall Island Radiological Survey (NMIRS)
— DOE directed; DOS
 - a. 11 atolls
 - b. 2 islands
6. LLNL Continuing Program (Bikini, Enewetak) 1978 to January 1983 -DOE directed; DOS
7. LLNL Continuing Program (Bikini, Enewetak, Rongelap)
January 1983 to September 1990 – DOE directed; DP
8. LLNL Continuing Program (Bikini, Enewetak, Rongelap)
October 1990 to Present – DOE; ES&H

- Field experiments and sample collection
- Sample processing and analysis
- Data accumulation (data bank) and evaluation
- Radiological dose assessment
- Remedial measures
- Redirection of field experiments and sample collections
(lag time)

Integrated Approach

Mission Progression (Continued)



Mission Progression (Continued)



Major Projects within the LLNL Marshall Island Environmental Radioecology and Dose Assessment Program

- Field project (experimental design, sample collection, sample processing, analytical)
- Assessment project (evaluation and compilation of data, dose assessments, papers, congressional testimony, meeting with RMI and Marshallese communities)
- Data Bank Project

Mission Progression (Continued)

Goals of the Field Project

- 1. Measure the radionuclide concentration in foods, soil, and water at Bikini, Enewetak and Rongelap Atolls.**
- 2. Measure the resuspension of radionuclides in the atoll ecosystem.**
- 3. Measure or estimate the external gamma exposure rate inside houses, outside houses and around village areas to compare with island average values.**
- 4. Provide data for the assessment of the radiological consequences of resettlement of Enewetak, Bikini, and other atolls in the Northern Marshall Islands.**
- 5. Evaluate methods for reducing the soil radionuclide inventory and radionuclide uptake by locally grown subsistence crops.**
- 6. Determine the residence time (environmental half-life) of ^{137}Cs in atoll ecosystems.**



Mission Progression (Continued)

Goals of the Field Project (Continued)

7. Define concentration factors and correlation factors for use in predictive environmental dose models.
8. Provide data for an ecological systems model for ^{137}Cs transport, recycling, and fate.
9. Provide a basis for deriving guidelines for agricultural practices that will minimize population exposure via terrestrial foods.
10. Provide data to define the need and develop guidelines for the long-term radioecological surveillance and research on Enewetak, Bikini, and Rongelap.
11. Provide a comparison of radionuclide concentrations, transfer factors, resuspension, and cycling with other environments and sources.
12. Provide current data for the radiological conditions at the various atolls for DOE and the Congress.

- Goals of Assessment Project**
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1. Provide radiological dose assessments of resettlement options at Bikini, Enewetak, and other atolls in the Northern Marshall Islands.
 2. Compare the predicted doses for alternate living patterns with Federal Guidelines and worldwide background doses.
 3. Make general recommendations on land use at the atolls.
 4. Provide guidance for the needed research programs to develop data for refined radiological assessments and remedial methods.
 5. Provide data for congressional testimony, meetings with RMI and the Marshallese communities, and refuting wild speculation and erroneous assessments of the radiological conditions in the Marshall Islands.



Mission Progression (Continued)

Mission Progression (Continued)

Goals of the Data Bank Project

- 1. Provide an organized and readily accessible source for all our data for our dose assessments and modeling efforts.**
- 2. Provide for the U. S. Government a single data management system from which to retrieve radiological information needed to support U.S. interests in the Pacific. (This was requested by both DOE and the Department of Justice.)**
- 3. Incorporate in this centralized data bank all radiological and related data obtained in the Marshall Islands before, during, and after the U.S. nuclear testing program.**



LLNL ENVIRONMENTAL PROGRAM

HOW ARE FIELD PROGRAM REQUIREMENTS ACCOMPLISHED?

- o Use of DOE/NVOO contracted vessel to bring sampling teams and equipment to the 4 affected atolls twice per year**
- o Vegetation, animal, and soil samples shipped frozen on barge from Kwajalein to Honolulu to Oakland Army Base**
- o Must clear US Customs in Oakland**
- o Permits from USDA & CSDA for importation of these sample types must be maintained**
- o Shipped by truck from Oakland to LLNL where analyzed**
- o MAC flights only used for high priority samples due to high shipping costs**